CHAPTER 3

CHINA'S MILITARY POWER AND ITS EFFECTS ON AMERICAN INTERESTS AND REGIONAL SECURITY

SECTION 1: CHINA'S MILITARY MODERNIZATION

> The Commission shall investigate and report on "REGIONAL ECONOMIC AND SECURITY IMPACTS—The triangular economic and security relationship among the United States, [Taiwan], and the People's Republic of China (including the military modernization and force deployments of the People's Republic of China aimed at [Taiwan]), the national budget of the People's Republic of China, and the fiscal strength of the People's Republic of China in relation to internal instability in the People's Republic of China and the likelihood of the externalization of problems arising from such internal instability."

Key Findings

- China continues its extensive military modernization program. For the tenth year in a row, China's new annual military budget will reflect double-digit growth over the previous year's. According to Chinese government figures, the 2006 budget will increase 14.7 percent from the previous year to approximately $35 billion. The Department of Defense believes China's actual defense expenditures could be two to three times higher at $70—$105 billion.
- In the near term, among China's principal military modernization aims are to deter Taiwan from moving toward independence; to defeat and occupy Taiwan if it declares independence and to accomplish this before U.S. or other military assistance can arrive; and to deny U.S. forces the ability to intercede effectively in such a conflict and prevent China from prevailing.
- Despite calls for increased transparency, Beijing continues to shroud much of its military structure, activities, and intentions in secrecy, leading to increased chances for misunderstanding and potential conflict.
- China has recognized the profound effectiveness and strategic importance of force multipliers such as advanced command, control, communications, computer, intelligence, surveillance, and reconnaissance (C4ISR) capabilities employed by U.S. forces, and it is exerting great efforts to enhance its C4ISR abilities and integrate them in its military procedures. Once the People's Libera-

tion Army (PLA) achieves these objectives, it will be a much more effective and formidable fighting force.
- China's military intentions beyond Taiwan remain unclear. The PLA understands itself to be in an extended military competition with the United States.
- The PLA's doctrine recognizes that to succeed against a sophisticated potential adversary such as the United States, it must among other things be able to disrupt the adversary's C4ISR advantages through such means as attacking its computer and communications systems. Accordingly, the PLA is establishing information warfare units and capacities, and developing anti-satellite capabilities.
- China is pursuing measures to try to control the seas in the Western Pacific and developing space warfare weapons that would impede U.S. command and control.

Overview

In its February 2006 Quadrennial Defense Review Report (QDR), the U.S. Department of Defense warned of China's military potential. Specifically it noted that "Of the major and emerging powers, China has the greatest potential to compete militarily with the United States and field disruptive military technologies that could over time offset traditional U.S. military advantages absent U.S. counter strategies."[1] The QDR also stressed that the pace of China's military modernization effort puts regional strategic balances at risk.[2] Currently, China's military, the People's Liberation Army (PLA)[3], is undergoing a long-term, comprehensive modernization aimed at fighting conflicts of high intensity and limited duration near its borders.[4] This accelerating military modernization and buildup hold serious implications for the East Asian region, the United States, and, depending on China's long term global strategic aspirations, the world.

Currently, Beijing focuses on bolstering military capabilities to address Taiwan Strait scenarios.[5] China aims to prevent Taiwan from obtaining legal recognition as an entity independent from the People's Republic of China, and resolutely adheres to its ambition for unification with Taiwan in the long term under the rubric of "one China." This objective is of such significance that the Chinese government continues to threaten to achieve it—and prevent any substantial contrary movement—by force if that is necessary. In March 2005, China promulgated the Anti-Secession Law, a legal document that codified the authority to use force to counter Taiwan's moves toward further separation.

During 2006, cross-Strait tensions appear to have receded to a degree, and Chinese leaders have been less strident in their comments to and about Taiwan. Nonetheless, the United States accepts the reality of China's threat to use military force to prevent Taiwan from claiming or declaring independence from China. This would include military action to deter, deny, or delay outside assistance, including U.S. assistance, to Taiwan.[6] China's growing military capability may embolden Beijing to adopt a more aggressive approach toward Taiwan or parties to other disputes, particularly if there is

reason to believe the United States or others would be unlikely, unprepared, or unwilling to intervene.

China's military threat against Taiwan also presents an implicit threat to U.S. forces as a result of tacit U.S. defense assurances to Taiwan, particularly those contained in the Taiwan Relations Act enacted in 1979. That Act states that the United States will "provide Taiwan with arms of a defensive character" and will "maintain the capacity of the United States to resist any resort to force or other forms of coercion that would jeopardize the security, or the social or economic system, of the people on Taiwan."[7] Taiwan's successful conversion from authoritarian rule to a democracy makes it symbolically important to many Americans, and increases the likelihood that the United States would commit its forces to assist in defending Taiwan in a conflict with China. For these reasons, and because any cross-Strait conflict likely would result in massive humanitarian, economic, and political consequences throughout Asia and even in other portions of the world, it is very important to dissuade both Beijing and Taipei from taking steps that could endanger the status quo and lead to the outbreak of war. Toward this end, the United States seeks to maintain a credible deterrence to China's use of force against Taiwan, and, at the same time, encourages Taiwan to avoid rhetoric and actions that would inflame China while simultaneously "correct[ing] imbalances in the areas of air and missile defense, and anti-submarine warfare." Toward this end, the United States has offered to sell such defensive military systems to Taiwan.[8]

It is in U.S. interests to possess and deploy sufficient military capability (1) to persuade China that the United States can and will inflict severe injury on Chinese forces and objectives if it intervenes in a China-Taiwan conflict on behalf of Taiwan, and (2) to prevail rapidly and with low costs in battle damage and casualties should it intervene in such a conflict. It also is in U.S. interests to help Taiwan ensure its military is sufficiently robust to prevent China from landing a knock-out blow before American military forces can arrive and engage in a defensive effort.

Although there is no evidence China has near-term aspirations to acquire the military ability to project power around the globe in a way that would effectively compete with the United States, it is apparent that China is working to increase its military's reach in the Asia-Pacific region and beyond. This involves not only acquisition of new naval and air force weapons systems and capabilities, but also greater integration of forces in the PLA to improve its coordination and extend its reach beyond green-water territories.[9] This is not surprising given China's growing international commercial and diplomatic involvement. According to retired Admiral Eric McVadon, "an emerging China wants to build a military appropriate to the country that it is becoming."[10]

Increasingly, Chinese forces operate beyond China's immediate coast and borders.[11] Essentially, China is "at the very beginning stages of power projection capability."[12] Evidence suggests that Beijing's continued military development will allow it to extend power beyond the Taiwan Strait,[13] and that this is a Chinese strategic objective. With China's growing economic reliance on international trade, and the country's increasing dependence on im-

ported petroleum, it undoubtedly will increase its efforts to protect its sea lines of communication (SLOCs).[14] Cortez Cooper, Director of East Asian Studies at Hicks and Associates, Inc., stated in his testimony before the Commission, "By roughly 2020, Beijing hopes to be able to focus on the greater periphery, particularly the Strait of Malacca, the Indian Ocean, and the Persian Gulf. This obviously would require development of a blue water fleet and a strategic bomber force . . . to conduct operations out to that distance."[15] China also could take advantage of a more advanced military to threaten use of force, or actually use force, to facilitate desirable resolutions of disputes over natural resources and territorial claims such as those with Japan.[16]

In response to China's military modernization program, the United States has realized the necessity of developing a strategy to "'encourage China to make the right strategic choices for its people while we hedge against other possibilities.'"[17] As Peter Rodman, Assistant Secretary of Defense for International Security Affairs, explained in his March 2006 testimony, hedging implies taking a realistic approach toward China's military ambitions, cooperating with allies in the Asian region to form a balance of power, and ensuring that our own military remains prepared for contingencies involving China.[18] Moreover, hedging encompasses the "measures we can take to reorient our global posture for the opportunities and the challenges of the 21st century."[19]

James Thomas, Deputy Assistant Secretary of Defense for Resources and Plans, underscored the fact that hedging is a prudent, historical methodology for addressing the changing military capabilities of other countries, especially when their intentions are not always clear.

China's Military Opacity

Beijing's military opacity contributes to the fear that China is becoming a growing threat in the Western Pacific, and possibly beyond. It also raises the chances for misunderstanding and military miscalculation.[20] According to the U.S. Department of Defense, "[t]he outside world has little knowledge of Chinese motivations and decision-making or of key capabilities supporting PLA modernization."[21] China's opacity has led and will continue to lead others to consider possible scenarios for conflict and to "hedge" accordingly.[22]

A central contributor to the opacity is China's active policy of deception and misinformation.[23] Dr. Jacqueline Newmyer, Senior Analyst with the Long-Term Strategy Project at Harvard University, defines this policy as corresponding to the traditional Chinese notion of military power, *shi*, that uses intelligence to surprise enemies with drastic policy changes or unexpected attacks.[24] To employ this traditional stratagem, China must place a high priority on spying to increase its intelligence advantage and also prevent others from collecting information about China; it accomplishes this through "concealment and deception."[25]

In his testimony to the Commission, Assistant Secretary Rodman noted that "We are caught by surprise by the appearance of new systems that suddenly appear fully developed."[26] China's active deception is compounded by its unwillingness to divulge information

or engage the U.S. military. For example, China's exclusion of the United States from certain security exercises, such as those in 2005 with Russian forces, indicates that China is unwilling to reveal meaningful information and intentionally obstructs U.S. efforts to achieve military transparency.

As one means of achieving greater Chinese military transparency, some defense analysts advocate increasing military-to-military contacts with China that will advance the exchange of information and allow opportunities to collect data.[27] Such contacts have been limited since the 2001 Chinese downing of a U.S. Navy EP–3 surveillance plane on Hainan Island.[28] Secretary of Defense Donald Rumsfeld's October 2005 trip to China produced an agreement to expand senior-level visits by defense officials.[29]

In May 2006, Admiral William J. Fallon, the commander of U.S. Pacific forces, visited Chinese military installations.[30] In June, Assistant Secretary Rodman traveled to China to discuss increasing military contacts.[31] Later that month a Chinese delegation accepted an invitation to observe a U.S. military exercise known as "Valiant Shield"[32] and the command ship of the U.S. Navy's Seventh Fleet, the *U.S.S. Blue Ridge,* visited Shanghai.[33] Most recently, General Guo Boxiong, Vice Chairman of the Central Military Commission and China's highest ranking general, visited the United States in July for a week-long tour, including visits to the National Defense University and the Navy's Third Fleet in San Diego.[34] These may be positive steps, but the Commission remains concerned that, because of the lack of reciprocity in access, they may disproportionately benefit the PLA. Military-to-military contacts with China should be calculated so that they do not increase the PLA's knowledge of U.S. military capabilities. Some charge that in the past China's military has not provided the same level of access that it has received from the U.S. military.[35] However, U.S. armed forces personnel were granted observer status for one day in the final phase of China's 2005 Northern Sword military exercise in Inner Mongolia—an exercise that involved roughly 16,000 PLA personnel.[36]

To reduce the number of surprises the United States encounters with respect to new or enhanced Chinese military capabilities and activities, it will be necessary for the U.S. intelligence community to increase its focus on China's military; its objectives, doctrine, and strategy; and its modernization efforts, and dedicate increased personnel and other collection and analysis resources to this purpose. If the focus and resource allocation are not commensurate with the assessment of the threat China potentially poses as stated in the Defense Department's QDR, the United States should expect repeated—and unpleasant—surprises from China, some of which may pose significant threats to U.S. interests.

China's Defense Expenditures

China's very substantial and rapidly growing investment in enhanced military capacity casts a shadow on its self-described "peaceful rise." From 1994 to 2004 China's publicly acknowledged defense budget grew at an average annual rate of 15.8 percent. This March, Beijing announced that its 2006 defense budget is expected to rise 14.7 percent from the previous year—from 244 billion

renminbi in 2005 to 280 billion renminbi ($35 billion).[37] However, China's budget does not include items commonly accounted for in military budgets, including procurements of weapons abroad; research and development expenditures; funding of paramilitary groups such as the People's Armed Police; and government subsidies to the defense industry.[38] Taking into account these missing figures and other transparency problems, the Department of Defense believes China's total military budget may be two to three times higher than the announced amount—in the range of $70—$105 billion.

China's military budgetary picture is ultimately "clouded by a multitude of funding sources, subsidies, and cutouts at all levels of government and in multiple ministries. Real spending on the military, therefore, is so disaggregated that even the Chinese leadership may not know the actual top line."[40] But the salient fact is that it is growing substantially on a sustained basis. And it appears that one key reason is to enable the Chinese military to obtain national objectives that run counter to U.S. interests.

According to a Defense Department specialist on China, the Administration has discussed military accounting and budgeting transparency with China, most notably when Assistant Secretary Rodman traveled to Beijing in June 2006 for the Defense Consultative Talks. The United States encourages China to adopt international standards for reporting military budgets and expenditures to facilitate the accuracy of estimates about China's progress and the nature, extent, and purposes of its military modernization.

Domestic Defense Industrial Capacities

China works to modernize its military and reduce reliance on imported military equipment and technologies.[41] This effort is advancing in some ways while still facing serious limitations in others.

For decades, the productivity, efficiency, and innovation of China's state-owned defense industries lagged well behind Western defense industries. Although "sweeping conclusions about the backwardness of the [Chinese] defense-industrial complex are no longer accurate" because of reforms initiated in the 1990's, comparably sweeping "claims about systemic reform are equally unwarranted."[42]

Beijing introduced "commercialization" principles to some defense industries, hoping to improve their capacities[43] and make them more responsive to the PLA's modernization needs and improve efficiency.[44] Layoffs and consolidations constitute part of the means for reaching these goals. As China's defense budget continues to grow, so do the resources and sales generated by these companies, allowing them to improve equipment and attract increasingly qualified employees.[45]

According to Dr. Roger Cliff, Senior Analyst at the RAND Corporation, "China's defense industries are advancing increasingly rapidly, and striving to close the technological gap with the United States."[46] Research and development (R&D) capabilities also benefit from the heightened military spending.

Additionally, China's emerging private sector, with growing access to Western equipment, technology, and know-how, supports

the country's defense modernization efforts. According to Dr. Adam Segal of the Council on Foreign Relations, "Chinese policy makers are working to ensure that the civilian economy makes a more direct contribution to defense modernization ... dismantling many of the barriers between civilian and defense R&D ..."[47] China is particularly interested in acquiring Western civilian goods and technologies that have military applications.

But China's defense industrial base still has serious problems and faces the challenge of implementing reforms. In addition, reforms have not greatly increased competition within the defense sector, further hindering innovation and accountability. As a result, China's military modernization efforts are complicated and slowed, and the financial resources China is investing cannot be spent with optimum efficiency.

Airpower and Air Defense

The PLA Air Force, with more than 700 combat aircraft based within striking distance of Taiwan,[49] has been described as "a defensive force with offensive aspirations."[50] Beijing wants a force capable of muscling opponents further away from its shore and the vicinity of Taiwan in the event of a conflict.[51]

Newer, fourth-generation aircraft—with capabilities equivalent to current U.S. or European aircraft—constitute an increasing portion of China's air force.[52] Its military aviation industry, drawing heavily on foreign technologies, has "made more progress in improving quality and technological sophistication of aircraft in recent years than in the previous decades ... a noteworthy rate of improvement."[53] Reportedly, China's Shenyang Aircraft Industry Company and the Chengdu Aircraft Industry Company are developing advanced fourth generation fighters, including a new twin-engine fighter with stealth technology known as the J–12 expected to have many of the capabilities of the fifth-generation F/A–22.[54] These planes could be flying for the PLA Air Force by 2015.[55]

China continues to turn to Moscow for tactical, maritime, and multi-role aircraft and other aviation-related technology.[56] For example, Russia continues to supply China with fourth generation Su–30MK2 and Su–30MKK aircraft,[57] and provides to the PLA Navy advanced multi-role helicopters.[58] Beijing may also be interested in the Russian-made Tu–22M–3/ BACKFIRE bomber which could improve China's sea-denial and -control ability and allow it to target U.S. facilities on Guam, based on its reported combat radius.[59]

Mr. Cooper explained to the Commission that China is acquiring or developing aerial refueling capabilities, airborne targeting capabilities, and over-the-horizon radars.[60] It also has advanced, Russian-made SA–10 and SA–20 surface-to-air missiles on its side of the Taiwan Strait and is expected to field the Russian S–300PMU2 surface-to-air system this year.[61] The S–300PMU2 has an extended range allowing China to engage targets over Taiwan.[62] Despite these improvements and acquisitions, Cooper maintained that the PLA Air Force will not be able to project power beyond Chinese territory and the near periphery,[63] especially without the development of a strategic bomber force.

The Chinese have fielded unmanned aerial vehicles and the PLA operates them at the company and squad levels[64] to provide "additional options for long-range reconnaissance and strike [capabilities]."[65] China's special operations forces also employ unmanned aerial vehicles, or drones[66] and the PLA reportedly has a unit that monitors U.S. drones operating in Afghanistan[67] while simultaneously developing its own Predator 1-sized drones.[68]

These developments in China's air power will make it more difficult and costly for the United States to prevail over China if it intervenes in the event of a conflict between China and Taiwan, but there appear to be few other notable implications for the United States.

Ground Forces

The PLA has been downsizing its traditional ground forces while improving technology and equipment to enhance the level of unit efficiency and capability. China's ground forces number approximately 1,600,000—about 200,000 less than a year earlier and a significant decrease from 2.2 million soldiers ten years ago[69]—but still more than 70 percent of China's total military personnel. These ground forces consist primarily of 18 group armies, each with an approximate troop complement of 30,000 to 65,000.[70]

A major focus of PLA modernization is the replacement or improvement of old equipment, including improvements to the Type 59/69 tanks that comprise much of the PLA's tank force. China's Type 63 amphibious light tank has been replaced with the Type 63A that has "a significant increase in its amphibious capabilities and firepower."[71] The Type 63A has an improved turret holding a 105mm rifled tank gun, similar to those on PLA main battle tanks, which if stabilized results in a "fire on the move" capability and an increase in first-round hit probability.[72] Overall, these light tank enhancements improve the PLA's amphibious resources that are a key factor in scenarios involving conflict with Taiwan.

PLA artillery equipment includes approximately 14,000 towed artillery pieces, 1,200 self-propelled artillery units, and more than 2,400 multiple rocket launchers.[73] Beijing's 2005 International Aviation Expo unveiled the latest PLZ05 155mm self-propelled howitzer, bearing resemblance to the Russian MSTA–S 2S19 152mm model and allegedly supporting a fully automatic loading system greatly improving efficiency and reliability.[74]

The Military Balance 2006 reports that the PLA has only 421 helicopters, a relatively small number given the size of its operational forces.[75] But China's helicopter production capabilities continue to improve.[76] Reports indicate that the Changhe Aircraft Industries Group and the China Helicopter Research and Development Institute are developing a third generation, dual seat attack helicopter referred to as the WZ–10.[77] Changhe is reportedly producing another helicopter, the WZ–11, capable of carrying antitank missiles and rocket pods.[78]

Exemplifying the Chinese military's focus on the Taiwan Strait, the army recently increased by 25,000 (or seven percent) to 400,000 the number of troops in the three military regions opposite Taiwan—Jinan, Nanjing and Guangzhou.[79] The PLA's main training objectives appear related to amphibious operations such as the Au-

gust 2005 Peace Mission joint exercise with Russia. The amphibious component of this three-day exercise involved landing operations by 1,000 troops of the combined PLA ground, helicopter, marine, airborne, and special forces all exercising together (supported by naval and air forces), albeit in small units for short periods of time in limited areas.[80] Based on Chinese media accounts, in 2005 elements of two armored and eight infantry divisions (including both active and reserve units) and three infantry brigades participated in various levels[81] of amphibious training in the Nanjing, Guangzhou, and Jinan military regions.[82]

All these modernization steps are supportive of the PLA's overall strategy of fighting "local wars under the conditions of informationalization" by creating a more mobile, highly-trained, and responsive force. Central to this strategy, ground forces focus on training for electronic and information warfare and long-range precision strikes through joint forces cooperation.[83]

Naval Forces

It appears that China's short-term objectives for naval modernization correlate to China's goal of acquiring the ability to frustrate potential adversaries such as the U.S. Navy and deny the ability of its adversaries to operate in areas vital to China's interests such as the Taiwan Strait. Currently, China is hindered in achieving this goal by the lack of a strong, reliable fleet. The PLA Navy includes fewer than twenty ships possessing limited anti-air warfare defense systems and believed "capable of operating in an early 21st-century naval environment."[84]

China's maritime strategy relies on submarines to patrol the coastal waters, blockade the Taiwan Strait, and deter foreign navies from operating in the region in the event of a conflict.[85] Consequently, China continues to expand and improve a submarine fleet that is considered the PLA Navy's most "potent strength." China should have approximately 30 modern submarines in operation by 2007.[86] Specifically, China serially produces the *Song*-class diesel submarine and according to the Department of Defense has completed or nearly completed developing newer nuclear attack and ballistic missile submarines.[87] For example, the *Shang*-class (Type 093) nuclear attack submarine is now entering operation.[88] China is also procuring a second delivery of more modern Russian *Kilo*-class submarines.[89] (With the deployment of the newer submarines, China's *Ming*- and *Romeo*-class submarines likely will be decommissioned.[90])

China has placed a priority on modernizing its destroyer and frigate fleets and the PLA Navy's surface fleet is steadily improving, both qualitatively and quantitatively.[91] China received its first *Sovremenny II*-class destroyer from Russia, with a second expected by the end of the year.[92] Mr. Cooper predicts that by 2007 China should have more than 15 modern frigates equipped with upgraded air defense systems.[93] By 2008 the PLA Navy should be able to extend short-term sea-denial operations roughly 400 nautical miles from its shoreline.[94] The PLA Navy may be able to conduct these operations for several straight weeks by the end of the decade.[95]

Looking toward the future, China may seek to extend its naval capacities to its "greater periphery" that encompasses portions of

the Indian Ocean, the Persian Gulf, and the Strait of Malacca.[96] Should China wish to extend its naval reach westward to protect its energy-related interests in the Middle East or Africa, it would require a reliable blue-water fleet, possibly including aircraft carriers and a long-range bomber force.[97] Mr. Cooper estimates that by 2020 China could have a fleet in place to accomplish this objective.[98]

One of the presumed requirements of a blue-water fleet is one or more operational aircraft carriers. China appears interested in developing one indigenously.[99] It also recently repainted its Soviet-era *Kuznetsov*-class carrier with PLA Navy markings and refurbished its electrical systems and the flight deck.[100] Whether or not this will become China's first operational carrier remains to be seen; in any event, PLA Navy technicians use the ship to study carrier construction and design.[101]

Missiles

China continues to make significant strides in modernizing and enlarging its missile forces. Currently, there are at least ten types of ballistic missile systems that are either operational or under development.[102] China's longer-range missiles can target locations beyond the Pacific region; the CSS–4 can target portions of the continental United States.[103] In addition, Beijing continues to improve its older intercontinental ballistic missiles (ICBMs) and seeks to field increasingly mobile, accurate, and survivable, and therefore more credible, ICBMs.[104] Some of these include significant, newer systems that will become operational within the next four years, such as the DF–31 and DF–31A ICBMs as well as the sea-launched JL–2 [105] carried aboard the *Jin*-class (Type 094) submarine.[106] According to Assistant Secretary Rodman, China's newer "longer-range [missile] systems will reach many areas of the world . . . including virtually the entire continental United States."[107] Due for deployment in 2007, the DF–31A will be the first Chinese ICBM capable of hitting Washington, DC.[108]

China has an increasingly accurate and lethal short-range ballistic missile force arrayed against Taiwan that could complicate U.S. military planning and operations in the area.[109] Nearly 800 Chinese short-range ballistic missiles are stationed near Taiwan and during the past several years the number of these missiles has increased by about 100 missiles a year.[110] The newer generation missiles have greater range and accuracy.[111]

China is also making strides in the cruise missile sector. It is developing first and second generation conventionally armed land-attack cruise missiles, which eventually could be armed with nuclear payloads.[112] The PLA Navy and its Naval Air Force have obtained or are in the process of obtaining roughly a dozen types of anti-ship cruise missiles, including the Russian SS–N–22/SUNBURN and SS–N–27B/SIZZLER.[113] According to the Department of Defense, China's "pace of indigenous [anti-ship cruise missile] research, development, and production—and of foreign procurement—has accelerated over the past decade.[114] China's new *Shang*-class (Type 093) nuclear attack submarine reportedly will carry both anti-ship and land-attack cruise missiles.[115]

Just as China is working to improve its missiles, China is making significant investments in its space program. In October 2005, China conducted its second manned space mission, and plans to launch another manned mission in 2007 and a lunar robot probe by 2010.[116]

China's military space doctrine is opaque, but some experts believe that among the goals for the PLA's space program is obtaining space-related information dominance and the ability to disable its opponents' space assets in order to disrupt their space-based information and navigation systems in the event of conflict.[117] Regarding the first of these two objectives, China is working to develop advanced space-based imagery and reconnaissance systems to aid its military.[118] These capabilities will serve, as they do for the United States, as force multipliers and will make China's armed forces more competitive and lethal. With regard to the second space objective, there is evidence suggesting that China "is developing the capacity to deny . . . [the use of space] to others . . . [and has] at least one ground-based laser anti-satellite research and development program underway." In September 2006, U.S. officials confirmed that China, in fact, has test fired such lasers at U.S. satellites.[120] According to the Department of Defense, "Acquiring more sophisticated space systems will allow China to expand the reach of its anti-access forces and could serve as a key enabler for regional power projection.[121]

Information and Cyber-Warfare

China is actively improving its non-traditional military capabilities. Chinese military strategists write openly about exploiting the vulnerabilities created by the U.S. military's reliance on advanced technologies and an extensive C4ISR infrastructure it uses to conduct operations.[122] China's approach to exploiting the technological vulnerabilities of adversaries extends beyond destroying or crippling military targets. Chinese military writings refer to attacking key civilian targets such as financial systems.[123]

The Commission believes Chinese intelligence services are capable of doctoring computer systems. It has seen clear examples of computer network penetrations coming from China, some of which were publicized in the "Titan Rain" exposé that received substantial press coverage. In August and September 2006, attacks on computer systems of the Department of Commerce's Bureau of Industry and Security forced the Bureau to replace hundreds of computers and lock down Internet access for one month.[124]

The PLA, leveraging private sector expertise, steadily increases its focus on cyber-warfare capabilities and is making serious strides in this field.[125] According to the Department of Defense, the PLA's cyber-warfare strategy has evolved from defending its own computer networks to attacking the networks of its adversaries and limiting their ability to obtain and process information,[126] and PLA information warfare units are developing viruses to harm the computer systems of its enemies.[127] Such attacks would be intended to disable defense systems that facilitate command and control and intelligence communication and the delivery of precision weapons,[128] primary instruments for the conduct of modern U.S. warfare.

China also works to improve its own C4ISR capabilities. For example, the PLA reportedly has mobile command and control centers where commanders interact with frontline units through digital wireless and satellite communications and gather additional real-time battlefield information.[129]

Intelligence

China is hungry to acquire, adapt, and capitalize on the value of capabilities and technologies available elsewhere. Whether in the military or the commercial realm, China is willing to acquire and exploit the knowledge developed by others; it will do this legally if possible, and otherwise illegally by espionage. In this way it saves tremendous sums it otherwise would have to invest in research and development; arguably more importantly, it shrinks the amount of time necessary to transform an idea into reality.

In this effort, China has established an impressively large human intelligence apparatus that extends far beyond traditional military and national intelligence operations. For example, "... there are between 2,000 and 3,000 Chinese front companies operating in the United States to gather secret or proprietary information ..."[130] China also often requests or requires its citizens who are studying or working in places where they have access to cutting-edge research activities or to technology development and application to obtain whatever information about those activities they can obtain and provide the information to the Chinese government. This poses a very significant challenge for U.S. counterintelligence efforts. The number of Chinese exchange students and "specialty workers" entering the United States each year complicates the ability of U.S. immigration officials to track these students and workers.[131] The *Christian Science Monitor* reports that China's espionage often depends upon "relative amateurs: Chinese students and visiting scientists, plus people of Chinese heritage living in the U.S." to gather small amounts of military and economic data.[132]

Recently, several indictments of Chinese citizens for espionage have spotlighted China's spying activities in the United States. In October 2005 in California, for example, the Federal Bureau of Investigation (FBI) arrested a Chinese man (a naturalized U.S. citizen) who is an engineer for a U.S. defense firm and his wife and later arrested his brother, sister-in-law, and nephew. The FBI charged them with illegally obtaining and providing to China sensitive information related to submarine propulsion systems.[133]

China also cultivates relationships with U.S. officials in policymaking positions, illustrated by the charges filed against former Defense Intelligence Agency official Ronald Montaperto. Montaperto admitted he passed classified information to Chinese intelligence officials over a 22-year career in government, and he pled guilty to illegally retaining classified documents.[134]